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December 15, 1997

Mr. Wayne Praskins
Project Manager
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75 Hawthorne Street (SFD-7)
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Re: Release of Perchlorate to Ground and Groundwater via Historic Burn Practices

Dear Wayne:

During our meeting at Region 9 on October 22, 1997, we discussed other potential responsible parties (PRPs) for the release of perchlorate ion to the ground and groundwater in the BPOU. EPA indicated that additional evidence would be required to support the BPOU Steering Committee position that perchlorate disposal practices by Day & Night resulted in soil and groundwater contamination. Day & Night, as directed and overseen by the United States, placed perchlorate on the ground and burned the compound as described in documents previously submitted to EPA.

Documents submitted to regulatory agencies establish without question that the practice of burning perchlorate in burned areas results in release of perchlorate to soil and the transport of perchlorate through soil to groundwater.

1. In 1992 Radian Corporation prepared a report on behalf of Lockheed Corporation for submittal to the Santa Ana Regional Water Quality Control Board regarding Lockheed's Beaumont No. 1 facility. Portions of this report are enclosed. You will note that perchlorate was found in groundwater concentrations ranging upward to 9,000 $\mu\text{g/l}$ downgradient of Lockheed's burn pit area and that Radian attributes the source of the perchlorate to the burn pit.
2. United Technology Corporation - Chemical Systems Division located in San Jose, California develops, manufactures and tests solid propellant propulsion systems. The operation uses solid rocket motors containing aluminum and ammonium perchlorate suspended in a synthetic rubber matrix. Waste propellant has historically been thermally treated at an Open Burning Facility (OBF) located on the northeastern portion of the property. This OBF is approximately 17 acres in size and contains 10 Open Burning units (OBUs). From 1963 to 1992 all wastes were burned on the ground surface.

The facility is operating under RCRA and as such is addressing environmental restoration through the RCRA Facility Investigation/Corrective Measures Study process. Documents containing information on perchlorate in soil and water include: RCRA Facility Investigation/Corrective Measures Study (June 1991 - ICF Kaiser), RCRA Facility Investigation/Corrective Measures Study Addendum (June 1993 - ICF Kaiser), and Soil and Groundwater Characterization Summary - Open Burning Facility (April 1996 - ICF Kaiser).

Prior to 1996, limited investigation and analysis of soils and groundwaters for perchlorate were performed. As of 1996 only nine soil samples from the OBF were subjected to analysis for perchlorate. Six of these nine soil samples contained concentrations of perchlorate up to 450 mg/kg with an average concentration for all nine samples of over 150 mg/kg.

Concentrations in groundwater at the OBF in 1992 to 1995 varied by well, but ranged from non-detect to 48,000 µg/l with an average of approximately 7,000 µg/l. This confirms that high concentrations in OBF soils have contributed significant concentrations of perchlorate to groundwater. This is clear evidence that the burning process does not result in complete destruction.

The DHS web page contains information that concentrations of perchlorate up to 281,000 µg/l have been detected in groundwater at the facility. We expect that additional investigations are underway but have not seen any data collected in 1997.

The information referenced above clearly demonstrates that open burning of perchlorate on ground surfaces results in perchlorate entering the ground and groundwater. Since Aerojet followed the same general procedures for perchlorate burning at its Azusa facilities as did Day & Night, if EPA concludes that Day & Night did not contribute perchlorate to the groundwater, then Aerojet must be absolved of responsibility regarding perchlorate investigation and/or remediation, especially as to perchlorate furthest in distance and time from the presumed, but as yet undefined, upper end of the perchlorate plume.

On a related matter during the October 28, 1997 Watermaster Perchlorate Issues meeting, you and I each received a copy of a Stetson map showing perchlorate sampling and analysis data and locations from various wells in the San Gabriel Basin. This map shows numerous "hits" of perchlorate scattered throughout the region and remote from the BPOU plume. Two of these wells (City of Covina No 2 and Valencia Heights Water Company No. 4) contain perchlorate in excess of the provisional DHS action level. This

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map clearly demonstrates that other perchlorate PRPs may exist both within and outside of the BPOU boundaries. What is EPA's intent as to evaluating the basin and particularly the BPOU for other perchlorate PRPs?

Very truly yours,

Ramona Lee

for Donald E. Vanderkar, Director
Environmental Restoration Programs

cc: John Catts
BPOU Steering Committee

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**LOCKHEED BEAUMONT NO. 1
TREATABILITY STUDY**



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February 1992

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EXECUTIVE SUMMARY

Radian Corporation has been retained by Lockheed Corporation to identify potential sources of surface and subsurface contamination and to prepare a remediation plan for a former Lockheed Propulsion Company test facility (Site No. 1) near Beaumont, California. Previous investigations have identified a soil vapor plume, originating from former burn pits, which contains chlorinated volatile organic contaminants (VOCs), primarily 1,1-dichloroethene (1,1-DCE), trichloroethene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA). A narrow groundwater plume containing these contaminants in concentrations above state and federal Primary Maximum Contaminant Levels is present in the alluvial aquifer below the soil vapor plume. The groundwater plume originates and is widest at the burn pit and rocket motor production areas, and extends approximately 2 miles downgradient to the west. The same contaminants are also found in lesser concentrations in the upper, weathered portion of the underlying Mt. Eden Formation.

This report presents the test results of the treatability study conducted to investigate the subsurface characteristics during groundwater and soil vapor extraction, and to compare the effectiveness of vapor and groundwater treatment technologies. The objectives of the subsurface evaluation were to determine:

- The actual concentrations of contaminants in the soil vapor and groundwater at different locations during extraction;
- The pumping characteristics of the porous media in the subsurface that contain contaminated vapors and groundwater; and
- The rate at which soil vapor and groundwater can be extracted.

To provide technology-based engineering data, five technologies to treat the contaminated soil vapor and groundwater were evaluated and compared, as shown in Figure S-1 and summarized in Table S-1. Soil vapors contaminated with chlorinated VOCs

the groundwater. Figure 2-8 presents a contour map of TCE concentrations in groundwater. The highest contaminant concentrations are found in water table wells MW-24 and MW-26 drilled directly beneath the burn pits. The contaminants with the highest concentrations in these wells are TCE at 740 $\mu\text{g/L}$ (MW-24), 1,1-DCE at 740 $\mu\text{g/L}$ (MW-24), and 1,1,1-TCA at 140 $\mu\text{g/L}$ (MW-26). These levels are higher than the PMCL levels for 1,1-DCE (6 $\mu\text{g/L}$) and TCE (5 $\mu\text{g/L}$), but less than the PMCL for 1,1,1-TCA (200 $\mu\text{g/L}$). Figure 2-7 combines these results and presents a map of the total amount of contaminants present. Immiscible phase product or contamination was not observed during the drilling of these two wells.












In order to evaluate if contamination has migrated into the Mt. Eden Formation, deeper wells MW-31 (in the burn pits), MW-3, and MW-32 (downgradient) were drilled to depths of 85 to 140 feet below the water table. Water samples from these three deep wells did not contain detectable concentrations of organic compounds, indicating that contamination has not migrated to the deeper unweathered portion of the Mt. Eden Formation.

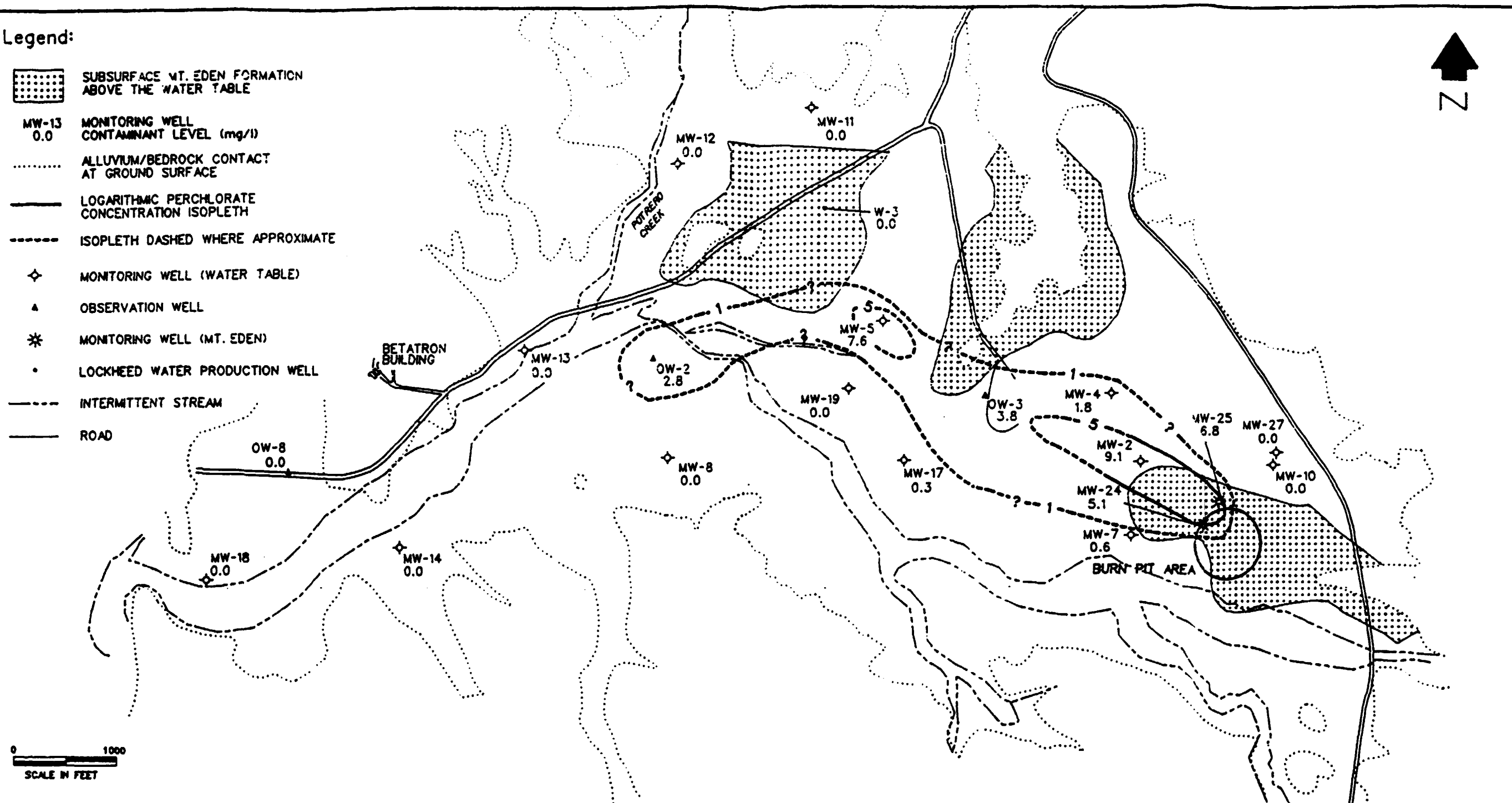
Data to evaluate the vertical distribution of contaminants were obtained from MW-30 and MW-21. MW-30, screened from about 30 to 65 feet below the water table, was pumped during the treatability study to supply water for the pilot treatment program. Chemical analysis of the discharge water indicated that the water from this well was much less contaminated than water from MW-21, which is approximately 22 feet from MW-30 and screened from 0 to 29 feet below the water table. The rapid decrease in contaminant concentrations with depth observed in these wells supports the conclusion that the contaminant plume is relatively thin. Analytical data from these and other wells screened at various depths below the water table indicate that the contaminant plume is probably less than 40 or 50 feet thick.

In addition to the presence of nitrates and chlorinated organics, perchlorates were detected in groundwater beneath the burn pit area. Ammonium perchlorate was used at the site as one of the ingredients in the manufacture of rocket fuels. Concentrations of

perchlorate in the groundwater ranged from less than 0.01 to 9.1 mg/L. A perchlorate contour map, shown on Figure 2-9, indicates that the perchlorate contamination most likely originates at the burn pit and migrates downgradient in a pattern similar to that of the other contaminants.

Legend:

-  SUBSURFACE MT. EDEN FORMATION ABOVE THE WATER TABLE
-  MW-13
0.0 MONITORING WELL
CONTAMINANT LEVEL (mg/l)
-  ALLUVIUM/BEDROCK CONTACT AT GROUND SURFACE
-  LOGARITHMIC PERCHLORATE CONCENTRATION ISOPLETH
-  ISOPLETH DASHED WHERE APPROXIMATE
-  MONITORING WELL (WATER TABLE)
-  OBSERVATION WELL
-  MONITORING WELL (MT. EDEN)
-  LOCKHEED WATER PRODUCTION WELL
-  INTERMITTENT STREAM
-  ROAD



**Figure 2-9. Lockheed Beaumont No. 1
Perchlorate Concentrations in
Shallow Groundwater (Spring 1991)**